

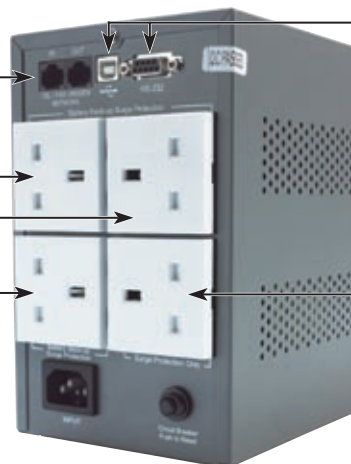
Uninterruptible power supplies

A power cut could spell disaster for your data and your hardware. Seth Barton explains how to tighten up your defences by setting up an uninterruptible power supply

PHONE SOCKET Protects your modem/router or fax device from a power surge through the phone line

UPS SOCKETS Provide conditioned, surge-protected electricity and continue to work in a power cut. Use only for essential equipment such as your PC and monitor

STATUS LEDS (ON FRONT) All UPS devices use LEDs and beeps to indicate their status. Your manual will explain what they mean



USB AND SERIAL PORTS Connect these to your computer to allow the UPS software to monitor system power and safely shut down the PC in a power cut. You'll need a matching port on your PC

SURGE-PROTECTED ONLY SOCKET Provides surge-protected electricity but stops working in a power cut. Suitable for non-essential equipment such as a laser printer

INTRODUCTION

Owning a PC isn't without its worries. Viruses try to damage your operating system, hard disks can fail and spyware can infiltrate your PC and disclose your personal details. We all know we should use a firewall and back up our most precious files, but few of us are prepared for a failure in mains electricity. A sudden power cut could wipe out hours of unsaved work and even cause damage to your hardware.

Mainland Europe has recently suffered a spate of power cuts, largely blamed upon a dramatic increase in heating and air conditioner usage, and ever-increasing burdens are being placed on the National Grid. Fortunately, it's simple and inexpensive to protect your PC from power cuts. Uninterruptible power supplies (UPS), which can cost as little as £36, can also protect you from any power surges and fluctuations in voltage.

Here we show you how to choose a UPS to match your PC and ensure you've got it set up correctly.

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UPS devices work by storing electricity in a heavy-duty battery. In the event of a mains power failure, they immediately provide power from this battery, keeping your PC running. They also condition the electricity supply, filtering out power surges. Unlike a simple surge protector, the output voltage from most UPS devices remains stable during a temporary reduction in mains power, known as a brownout, which might normally dim the lights and upset some electrical equipment.

You must choose a UPS suitable for your computer. Most importantly, you have to ensure that the UPS is capable of providing enough power to keep connected

equipment running. In most cases, you'll want to power only a PC and monitor during a power cut, but you might also need to keep other critical peripherals running, such as an external backup device or a router.

GETTING STARTED

Before buying a UPS, calculate the total power requirements of your essential equipment (see our Compatibility checklist below). Most equipment uses far less power than the rated maximum quoted on the power supply or serial number label. A modern desktop PC may have a power supply rated for 500W or more, but it uses only around 75W when idle, rising to a

Compatibility checklist



CHECK POWER USAGE

To find out the true power use of your equipment, connect it all to the same multi-way adaptor and measure the load with a mains power monitor (£27 from www.maplin.co.uk). For a less exact figure, use the Energy Star energy calculator at www.eu-energystar.org/en to get the approximate power requirements. Total the values for all your kit.



TYPE OF SOCKETS

A UPS with kettle-style sockets requires three-pin male-to-female extension leads, only a couple of which are normally supplied; you may need more. UPS devices with standard plug sockets accept any mains power lead but plug-in AC adaptors, as used by some routers, may obstruct neighbouring sockets. Make sure your UPS has enough sockets and cables for all your equipment.



SOFTWARE

Many UPS devices communicate their power status to your PC via a USB or serial cable. If you need this function, check your PC has a suitable port spare; a powered USB hub may fail during a power cut. Make sure any software supplied is compatible with your version of Windows. If you use one UPS for two PCs, you can install the software on only one of them.



maximum of 250W for a highly specified SLI system running a 3D game. A standard 17" LCD monitor uses an additional 30W, while a CRT may use double that. Peripherals such as routers and external hard disks consume 10W each.

UPS manufacturers normally quote a device's maximum output in volt-amps (VA). This figure is higher than the UPS's true power output because it includes an allowance for reactive power, which is power drawn by equipment only to be returned unconsumed to the mains. You can find a UPS's true power output, specified in watts, by looking at the manufacturer's website. Make sure you buy a UPS with a higher power rating than the combined total for your equipment. We recommend allowing at least 20 per cent headroom, so if your equipment uses 250W maximum buy a minimum 300W UPS.

Once you know your kit's rough power consumption, a UPS's specifications may tell you how long it will provide power at that load level. If not, you can calculate a best-case result if you know how many watt-hours (W-h) the supply's battery lasts for. This can often be found in its specifications, but you may need to work it out by multiplying the battery's voltage by its rated amp-hours (A-h). Divide the result by the power requirement you calculated for an indication of the maximum backup time you'll get.

Remember this is a best-case time and actual battery life will be less from a heavily loaded or older UPS. A cheap UPS may give you just long enough to save your work and shut down your PC in a power cut. If you need to keep working, or you're serving files or a website from your PC, you may need it to survive longer. If your PC is often left running unattended, choose a UPS that can communicate with your PC via a USB or COM port. The UPS's software will detect a power cut and shut down your PC safely before its battery runs out. The software also displays the remaining battery power or charge level.

Make sure the UPS has the right number and type of power sockets, as discussed in the Compatibility checklist opposite. Some sockets provide uninterrupted power, while others provide surge protection only and will switch off in a power cut. Most UPS have surge-protected sockets for phone lines and sometimes network cables to protect communication devices from lightning damage.

All UPS devices come with a warranty that covers connected equipment that the UPS fails to protect. The best warranties also provide cover for loss of data.



INSTALLATION

It's easy to set up a UPS. As with backup software, however, it's important to get the installation right and carry out tests so you can be confident that it will work correctly when you need it.

1 PHYSICAL INSTALLATION

Choose a suitable spot for your UPS. All UPS devices contain heavy lead-acid batteries, and high-capacity units can be particularly weighty. A UPS is usually best positioned on the floor, but leave space for ventilation as they can get warm while charging or discharging. UPS devices emit a strong electromagnetic field that may interfere with your monitor and could damage a magnetic storage device such as a hard disk MP3 player. Position your UPS at least 30cm away from sensitive devices, plugging it directly into an earthed wall socket, not into a multiple plug adaptor. Leave it switched off for now.

Plug your PC, monitor and any essential peripherals into the UPS sockets. If you want to stay connected to the internet in a power cut, make sure you plug your modem or router into the UPS. Plug non-essential devices such as printers or scanners into surge-protected sockets, if there are any. If there aren't, buy a simple surge-protected multi-way adaptor for them. If the UPS has a surge-protected phone socket or network port, simply daisy-chain your present connections through it. If required, connect the UPS to your PC using the USB or COM port.

Once everything is plugged in, switch on the UPS. Consult the accompanying manual to ensure the status lights aren't indicating any problems. If everything is OK, power up your PC. Your UPS should begin to charge, which may take eight hours or more. If your UPS has a data link to your PC and came with its own software, continue to Step 2; if you have a simple device with no software, go straight to Step 3.



2 SOFTWARE INSTALLATION

Follow the manufacturer's instructions to install the software that came with your UPS. Check the software has recognised the UPS correctly. You can use the software to monitor your UPS's status while it charges.

You can configure the software to shut down your PC automatically in a power cut. Most software will let you select how this happens. The most common option is to shut down the PC immediately upon detecting a power cut. This conserves battery power should you need it later, but remember that other connected peripherals may still be consuming some power. The alternative is to keep the PC running for as long as possible then shut it down just before the battery expires. This is preferable if you're running a website or may be accessing the PC remotely. Whichever you choose, you can override the automatic shutdown if required.

3 CONFIGURING YOUR PC

For your computer to power off successfully, you must ensure there's no software running that prevents a clean shutdown. Right-click on the desktop and select Properties, click on the Screen Saver tab and then the Power button. Go to the Hibernate tab and check the hibernation option is ticked. On the Power Schemes tab, change the drop-down setting so the system will hibernate after five minutes. Apply your changes and leave the PC till it hibernates, then power it back on and return it to its previous hibernation settings. If your PC doesn't hibernate cleanly, run Help and Support from the Start Menu. Type 'shutdown' into the box, select the Startup and Shutdown Troubleshooter and follow the instructions.

To reduce the risk of losing data when you power off, make sure programs such as Microsoft Office applications are configured to make regular autosaves of your work.

Testing and troubleshooting

We recommend that you allow your UPS to charge fully before you test it. For the first test, use a low-power device that won't be damaged by a sudden shutdown, such as a desk lamp. Plug the lamp into the UPS and switch off the power into the UPS. It should warn you that mains power has been lost and the lamp should remain on.

If this test works, restore power to the UPS and reconnect your PC. Boot your PC and make sure any UPS management software is running before turning off power to the UPS again. Check your computer stays on and any software actions such as shutting down happen as you expect. You may wish to time

how long your UPS powers your PC from a full charge, but remember it will take several hours to recharge afterwards.

UPS batteries wear out over time, so repeat this test every few months to check everything still works. You may need to replace your UPS battery after three to five years. Replacement batteries are available for larger UPS units and cost around two-thirds of the original price. Contact your local council to find out where you can recycle your exhausted battery.

If equipment doesn't remain on during power cuts, check you've connected it to a battery-protected port and not a surge-protected one. Also check that the UPS is fully charged.

If your UPS still doesn't work, make sure you haven't overloaded it. Remove all connected equipment and test it again with a desk lamp. Don't connect any high-power peripherals to a battery-protected socket; a laser printer can use more than 1,000W.

If connected equipment doesn't work and your UPS isn't recharging, check that the wall socket works with other kit and that the fuse hasn't blown in your UPS's power cable. If connected equipment works but your UPS isn't recharging, check that you fitted the battery correctly. If this happens with an older UPS, the battery may have reached the end of its life.